CLAIMS

WHAT IS CLAIMED IS:

1. An apparatus comprising:

a first current source current return (CSCR) pair, the current return being at a distance X from the current source, to receive current from the current source; and;

a monitor electrode disposed at a distance Y from the current return, said distance Y greater than or equal to the distance X, to monitor the current transmitted by the current source.

2. The apparatus of claim 1 further comprising a second CSCR pair, said second CSCR pair disposed along a longitudinal axis along said apparatus from the first CSCR pair, said second CSCR pair comprising:

a second current source and a second current return, said second current return at the distance X from the second current source; and

the second current return being at the distance Y from the monitor electrode.

3. The apparatus of claim 2 further comprising:

a third current source disposed between the current source and the current return of the first CSCR pair; and

a fourth current source disposed between the second current source and the second current return of the second CSCR pair.

4. The apparatus of claim 1 wherein the monitor electrode comprises an array of electrical contacts.

5. The apparatus of claim 2, wherein the first CSCR pair and the second CSCR pair comprises an array of electrical contacts.

6. An apparatus comprising:

a current source current return (CSCR) pair, the current return at a distance X from the current source, to receive current from the current source; and

a monitor electrode disposed at a distance Y from the current source, said distance Y greater than or equal to the distance X, to monitor the current transmitted by the current source.

7. The apparatus of claim 6 wherein the monitor electrode comprises an array of electrical contacts.

8. The apparatus of claim 6 wherein the current source and the current return comprises an array of electrical contacts.

9. A resistivity tool having a length, comprising:

a current source at a first location along said length;

a current return at a second location along said length;

a monitor electrode, said monitor electrode at a third location along said length, said third location not between said first location and said second location.

10. The resistivity tool of claim 9, further comprising:

a second current source at a third location along said length;

a second current return at a fourth location along said length;

said monitor electrode not being at a location between said second current source and said second current return.

11. The resistivity tool of claim 9, further comprising:

a second current source;

a third current source;

a fourth current source; and

a second current return;

wherein said monitor electrode is not between said first current source and said first current return, is not between said second current source and said first current return, is not between said third current source and said second current return, and is not between said fourth current source and said second current return.

12. The resistivity tool of claim 9, said monitor electrode being a first monitor electrode, further comprising:

a second monitor electrode at a same location with respect to said length as said first monitor electrode.

13. The resistivity tool of claim 9, wherein said resistivity tool is configured to measure resistivity around at least 60% of a generally circular borehole wall.

14. The resistivity tool of claim 9, said resistivity tool having a circumference and further comprising:

a second current source at a different location around said circumference than said first current source;

a second current return at a different location around said circumference than said second current source; and

a second monitor electrode at a different location around said circumference than said first monitor electrode, said second monitor electrode at a location along said length not between said second current source and said second current return.

15. The resistivity tool of claim 9, further comprising:

an arm;

a pad attached to said arm; and

said current source, current return and monitor electrode being mounted on said pad.

16. The resistivity tool of claim 9, said current source, current return, and monitor electrode being arranged linearly.

17. The resistivity tool of claim 9, said resistivity tool being a compensated resistivity tool.

18. The resistivity tool of claim 9, said resistivity tool being an uncompensated resistivity tool.

19. The resistivity tool of claim 9, said monitor electrode being a first monitor electrode, further comprising:

A second monitor electrode at a different location with respect to said length as said first monitor electrode.

20. The resistivity tool of claim 9, said resistivity tool measuring resistivities at multiple depths of investigation.

21. A method comprising:

transmitting a current from a first current source;

receiving at least part of the current at a first current return, said first current return disposed remotely from the first current source; and

measuring a first voltage at a monitor electrode, said monitor electrode disposed more remotely from below the first current source than said first current return.

22. The method of claim 21 further comprising using the measured voltage to calculate resistivity of an earth formation.

23. The method of claim 21 further comprising:

transmitting a second current from a second current source, said second current source disposed below the monitor electrode;

receiving a part of the second current at a second current return, said second current return disposed below the second current source; and

measuring a second voltage at the monitor electrode.

24. The method of claim 21 further comprising:

using the first voltage and the second voltage to calculate at least one of resistivity of the earths formation, standoff, and resistivity of a zone invaded with drilling fluid.

25. A method to determine invaded zone resistivity in a borehole with a non-conductive drilling fluid in a borehole, comprising:

measuring invaded zone resistivity by a tool at a first distance into said borehole;

measuring invaded zone resistivity by said tool at a second distance into said borehole; and

calculating a standoff distance from said tool to a wall of said borehole and said invaded zone resistivity.

26. The method of claim 25, said method further comprising:

modeling a tool response from initial values of standoff distance and invaded zone resistivity to determine values for standoff distance and invaded zone resistivity.

27. A method to measure a standoff between a resistivity tool and a wall of a borehole comprising:

measuring a resistivity at a first depth behind said wall of said borehole to obtain a first resistivity measurement;

measuring resistivity at a second depth behind said wall of said borehole to obtain a second resistivity measurement to said second resistivity measurement;

comparing said first resistivity measurement to said second resistivity measurement to establish a difference;

determining from said first and second resistivity measurement differences said magnitude for said standoff.

28. The method of claim 27, said resistivity tool designed to operate in non-conductive drilling fluid.

29. The method of claim 27, said borehole containing non-conductive drilling fluid.

30. The method of claim 27, said borehole having a length and wherein said first resistivity measurement and said second resistivity measurement are made at the same location along said borehole length.

31. A method to measure a presence of a standoff between a resistivity tool and a wall of a borehole comprising: